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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/725,257

12/02/2003

Ming-Jey Yang

NC 95,937

1959

26384

7590

04/10/2006

NAVAL RESEARCH LABORATORY
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EXAMINER

THOMAS, TONIAE M

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/725,257

Applicant(s)

YANG ET AL.

Examiner

Toniae M. Thomas

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14, 17 and 18 is/are pending in the application.
- 4a) Of the above claim(s) 11-14, 17 and 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4 is/are rejected.
- 7) ☒ Claim(s) 2, 3 and 5-10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of the species of Group I (claims 1-10) in the reply filed on 29 November 2005 is acknowledged. The traversal is on the ground(s) that "the claims were already searched and examined prior to the Office action of 06/03/05, thus continued examination of all claims would not present an undue burden on the PTO." This is not found persuasive. The MPEP states that, "where two or more species are claimed, a requirement for restriction to a single species may be proper if the species are mutually exclusive," and that "claims to different species are mutually exclusive if one claim recites limitations disclosed for a first species but not a second, while a second claim recites limitations disclosed only for the second species and not the first (see MPEP 806.04(f)). Therefore, the requirement is still deemed proper and is made FINAL.

Claims 11-14, 17, and 18 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary

Art Unit: 2822

skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tehrani et al. (US 5,349,214).

The Tehrani et al. patent (Tehrani) discloses a method of fabricating a heterostructure device (fig. 7 and accompanying text). The method comprises the steps of: providing a buffer layer 24 (fig. 7 and col. 7, lines 45-56); growing a bottom barrier layer 28 on the buffer layer (fig. 7 and col. 7, lines 45-56); growing a quantum well layer 29 on the bottom barrier layer (fig. 7 and col. 7, lines 45-56); growing a top barrier layer 32 on the quantum well layer (fig. 7 and col. 7, lines 45-56); forming a cap layer 34 on the top barrier layer (fig. 7 and col. 7, lines 45-56); and etching a portion of the cap layer to form conducting electrons in the quantum well layer below the etched portion of the cap layer (col. 6, lines 53-68).

The cap layer comprises no more than one InAs cap layer 34 (col. 7, lines 45-56).

Tehrani does not teach that the cap layer 34 is p-doped. However, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to provide a p-doped cap layer on the barrier layer 32. Note, that the cap structure 30, which includes cap layer 34, is selected so that the cap layer 34 overlying the quantum well layer 43 pins the Fermi level in the quantum well (col. 6, lines 53-59). Furthermore, the carriers in the quantum

Art Unit: 2822

well layer 29 can be either electrons or holes, i.e. the quantum well layer can be either n-type or p-type (col. 6, lines 40-48). Therefore, depending on the type of carriers in the quantum well layer 29, a p-doped cap layer is required to pin the Fermi level in the quantum well layer 29.

Allowable Subject Matter

3. Claims 2, 3, and 5-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Amendment

4. The declaration filed on 30 August 2005 under 37 CFR 1.131 has been considered but is ineffective to overcome the Tehrani et al. reference (US 5,349,214). The Tehrani et al. reference is a statutory bar under 35 U.S.C. 102(b) and thus cannot be overcome by an affidavit or declaration under 37 CFR 1.131.

Response to Arguments

5. Applicant's arguments with respect to claim 1 have been addressed in the rejection above.

6. Claims 11-14, 17, and 18 have been withdrawn from further consideration. Therefore, Applicant's arguments with respect to claims 11-14, 17, and 18 are moot.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone

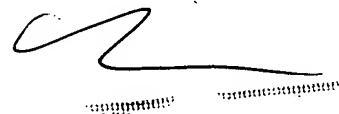
Art Unit: 2822

number is (571) 272-1846. The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMT
03 April 2006



Mary Wilczewski
Primary Examiner